Transportation Library
TF
1
.R16
V.69
part 1

INDEX.

VOLUME LXIX.

(VOLUME IX, NEW SERIES.)

1895.

ILLUSTRATIONS.

Aerial Navigation, On the Problem of, 99.
Aeroplane Stability during Flight, 481.
Ahren's Steam Boiler, 506.
Air Hoist for Locomotive Pits, 408.
Air Propellers, Some Experiments on the Efficiency of, 241.
Air Pumps for the United States Battleship "Texas," 312.
American Railway Master Mechanics' Association, The Convention of the, 325.
Among the Shops, 499.
Among the Shops, West Philadelphia, 408.
Angle-Shearing Machine, A Double Angle, 529.
Armstrong Pipe-Threading and Cutting-Off Machine, No. 2½, 94.
Atlanta Exposition, The, 572.
Automatic Longitudinal Stability, 145.

Balloon at the Champs de Mars, A Captive, 578.
Balloons, Captive, 45.
Balloons, United States War, 98.
Ball Reamers, Special Tool for Turning, 369.
Beam Compass, The Altenender, 431.
Begtrup's Engine, Crosshead, 95.
Blowers, Green's Rotary, 190.
Bolster for Bodies and Trucks for Freight Cars, The Diamond Pressed Steel, 237.
Boiler, 192.
Boiler, Ahren's Steam, 506.
Boiler, A New Style of Portable, 285.
Boiler and Engine, Schmidt's Superheated Steam, 89.
Boiler and Superheater, Combined Tubular, 335.
Boiler, Boyer's Sectional Water-Tube, 238.
Boiler-Cleaning Device, Smith's, 431.
Boiler for Class P Locomotive, Pennsylvania Railroad, 311.
Boiler, Moore's Vertical Water-Tube, 238.
Boiler, Mumford's Water-Tube, 239.
Boiler, Normand and Sigandy's Water-Tube, 555.
Boiler, Pierpoint's Water-Tube, 554.
Boilers and their Application to War Vessels, Water-Tube, 69.
Boilers, Arrangement of Furnace for Locomotive-Form, 471.
Boilers Due to Expansion and the Means of Lessening the Same, The Deterioration of Locomotive and Marine, 133, 165, 213.
Boiler, See's Water-Tube, 508.
Boilers, Some Facts Relating to Certain Types of Water-Tube, 159, 217, 260.
Boiler, Steam, 478.
Boilers and their Application to War Vessels, Water-Tube, 69.
Boilers, Water-Tube, 377.
Boiler, The Combine Water-Tube, 285.
Boiler, The Hogan Water-Tube, 237
Boiler Tubes, Physical Reasons for Rapid Corrosion of Steel, 157.
Boiler, Water-Tube, 189.
Boring Locomotive Cylinders, Mechanism for, 142.
Bork's Brick-Lined Locomotive Firebox, 87.
Boyer's Sectional Water-Tube Boiler, 238.
Brick-Lined Firebox, The Docteur, 545.
Brownley Double Tube Injector, 334.
Bulla's Locomotive, 239.

Captive Balloons, 45.
Car, A Steam Inspection, 25.
Car, Lehigh Valley Railroad, Hopper Gondola, 359.
Car, Railway, 478.
Car of 60,000 lbs. Capacity, Grand Trunk Railway, Standard Box, 461.
Cattle Guard, The Sheffield, 382.
Checking Machine, Belt Rail, Grand Trunk Railway, 498.
Check Valve, 335.
Chuck for Steam Chests, Planer, 428.
"Cincinnati," The Cruiser, 171.
Cinder Blow-Off, A, 8.
Clutch for 5-Ton Crane, Friction, 348.
Coal Storage Plant at Port Richmond, Philadelphia, 257.
Coal, The Proximate Analysis of, 374.
Compound Locomotive on the Paris, Lyons, and Mediterranean Railway, 29.
Compressor for Hydrogen Gas, 430.
Contributions to Practical Railroad Information, Method of Determining Ammonia in Ammonium Chloride, 72.
Contributions to Practical Railroad Information, Method of Determining Specific Gravity of Oils and Other Liquids, 449.
Counterbalance in Locomotive Drive-Wheels Upon the Pressure between the Wheel and the Rail, An Experimental Study of the Effect of the, 36.
Crane, Baltimore and Ohio Railroad, Five-Ton Steam, 253.
Crane, Central Vermont Railroad, Yard, 419.
Crank-Pin Turning Machine, Portable, 188.
Crosshead, Begtrup's Engine, 96.
Cylinder for Class P Locomotive Pennsylvania Railroad, 232.
Cylinder for Engines, Motors, or Compressors, 189.

Davis, Edward F. C., 429.
Dayton, Gas Engine, The, 476.
Deterioration of Locomotive and Marine Boilers due to Expansion, and the Means of Lessening the Same, The, 133, 165, 213.
Differential Power Working Head for Deep-Well Pumps, 554.
Dome Base, Pennsylvania Railroad, Pressed Steel, 254.
Down-Draft Furnace for Steam Boilers, The, 369.
Draft Sheets, 488.
Dredging Steamer "General C. B. Comstock," United States, 527.
Dynamite Guns, The Fuse for the Pneumatic, 375.

Electric Railways in Maryland, 411.
Emery from Polishing Wheels, Apparatus for removing, 470.
Engine for the Steam Yacht "Wapiti," Triple-Expansion for the, 19.
Engine, Hobart's Steam, 431.
Electric Motor in a Boiler Shop, The, 180.
Engine, Mundy's Hoisting, 189.
Engine, Schmidt's Double-Acting Steam, 240.
Engine, Schmidt's Superheated Steam Boiler and, 89.
Exhaust Pipes and Smoke Stacks, The Most Advantageous Dimensions for Locomotive, 516, 541, 559.

Farnsworth's Gas-Compressing Pump, 94.
Fay's Engine Valve, 168.
Feed-Water Heater, Nordberg's, 432.
Flint and Père Marquette Shops and Passenger Station at Saginaw, E. S. Michigan, The, 13.
Flue Welding Plant, 409.
Flying Machine, Lilienthal, 434.
Flying Machine, Pilcher's, 491.
Fly-Wheel Accident in Hoboken, A, 493.
Four-Wheeled Bogie Engine, The History of the, 70.
Friedeberg Apparatus for Burning Coal Dust, The, 121.
Fuel Economy in Locomotives, Possible Sources of, 101.
Fuel Gas, Conducted by the Southern Pacific Company at Sacramento, Cal., Some Tests with, 302.
Furnace for Steam Boilers, The Down-Draft, 369.
Fuse for the Pneumatic Dynamite Guns, The, 375.

Gas-Compressing Pump, Farnsworth's, 94.
Gas Engine, The Dayton, 476.
Gas Motor in Dresden, The, 319.
Grease Cup, Penberthy, 334.

Hargrave's Recent Experiments, 193.
Hay-Band Spinning Machine, 472.
Henszey's Improved Locomotive, 505.
Hinckley Slack Adjuster for Railroad Car Brakes, 95.
Hogan Water-Tube Boiler, The, 237.
Hoisting Engine, Mundy's, 189.
Horizontal Drilling, Tapping, and Stud-Inserting Machine, 283.
Hose, Rubber, 380.
Hydraulic Motor, Rotary, 191.
Hydrogen Gas Apparatus for the United States Signal Service, 46.

"Indiana," The United States Battleship, 543.
Indicator-Card Takers, A Device of Value to, 446.
Indicator Rigging for Locomotives, 493.
Injector, 191.
Injector, Brownley Double Tube, 334.
Injector, The International, 187.
Inspection Car, A Steam, 25.

Japanese National Industrial Exhibition at Kioto The, 397.
Japanese Warships, 18.
Joughins' Railroad Car-Truck, 508.
Joy Valve Gear, The, 130.

Kite, The War, 433.
Kleman Nut Lock, 476.

Lathe, Bogert's 28-in. Turret Engine, 286.
Lathe, Philadelphia & Reading Railroad, Pipe, 366.
Laval Steam Turbine, The, 405.
Laval Steam Turbine, The, 453.
Lilienthal Flying Machine, 434.
Link Grinding Machine, Grand Trunk Railway, 231.
Link, Warren's Improved, 110.
Locomotive, An Early Norris Express, 87.
Locomotive, Bulla's, 239.
Locomotive Drive-Wheels upon the Pressure between the Wheel and the Rail, An Experimental Study of the Effect of the Counterbalance, 36.

Transportation Library
TF
1
.R16
V.69
part 1

INDEX.

VOLUME LXIX.

(VOLUME IX, NEW SERIES.)

1895.

ILLUSTRATIONS.

Aerial Navigation, On the Problem of, 99.
Aeroplane Stability during Flight, 481.
Ahren's Steam Boiler, 506.
Air Hoist for Locomotive Pits, 408.
Air Propellers, Some Experiments on the Efficiency of, 241.
Air Pumps for the United States Battleship "Texas," 312.
American Railway Master Mechanics' Association, The Convention of the, 325.
Among the Shops, 499.
Among the Shops, West Philadelphia, 408.
Angle-Shearing Machine, A Double Angle, 529.
Armstrong Pipe-Threading and Cutting-Off Machine, No. 2½, 94.
Atlanta Exposition, The, 572.
Automatic Longitudinal Stability, 145.

Balloon at the Champs de Mars, A Captive, 578.
Balloons, Captive, 45.
Balloons, United States War, 98.
Ball Reamers, Special Tool for Turning, 369.
Beam Compass, The Altenender, 431.
Begtrup's Engine, Crosshead, 95.
Blowers, Green's Rotary, 190.
Bolster for Bodies and Trucks for Freight Cars, The Diamond Pressed Steel, 237.
Boiler, 192.
Boiler, Ahren's Steam, 506.
Boiler, A New Style of Portable, 285.
Boiler and Engine, Schmidt's Superheated Steam, 89.
Boiler and Superheater, Combined Tubular, 335.
Boiler, Boyer's Sectional Water-Tube, 238.
Boiler-Cleaning Device, Smith's, 431.
Boiler for Class P Locomotive, Pennsylvania Railroad, 311.
Boiler, Moore's Vertical Water-Tube, 238.
Boiler, Mumford's Water-Tube, 239.
Boiler, Normand and Sigandy's Water-Tube, 555.
Boiler, Pierpoint's Water-Tube, 554.
Boilers and their Application to War Vessels, Water-Tube, 69.
Boilers, Arrangement of Furnace for Locomotive-Form, 471.
Boilers Due to Expansion and the Means of Lessening the Same, The Deterioration of Locomotive and Marine, 133, 165, 213.
Boiler, See's Water-Tube, 508.
Boilers, Some Facts Relating to Certain Types of Water-Tube, 159, 217, 260.
Boiler, Steam, 478.
Boilers and their Application to War Vessels, Water-Tube, 69.
Boilers, Water-Tube, 377.
Boiler, The Combine Water-Tube, 285.
Boiler, The Hogan Water-Tube, 237
Boiler Tubes, Physical Reasons for Rapid Corrosion of Steel, 157.
Boiler, Water-Tube, 189.
Boring Locomotive Cylinders, Mechanism for, 142.
Bork's Brick-Lined Locomotive Firebox, 87.
Boyer's Sectional Water-Tube Boiler, 238.
Brick-Lined Firebox, The Docteur, 545.
Brownley Double Tube Injector, 334.
Bulla's Locomotive, 239.

Captive Balloons, 45.
Car, A Steam Inspection, 25.
Car, Lehigh Valley Railroad, Hopper Gondola, 359.
Car, Railway, 478.
Car of 60,000 lbs. Capacity, Grand Trunk Railway, Standard Box, 461.
Cattle Guard, The Sheffield, 382.
Checking Machine, Belt Rail, Grand Trunk Railway, 498.
Check Valve, 335.
Chuck for Steam Chests, Planer, 428.
"Cincinnati," The Cruiser, 171.
Cinder Blow-Off, A, 8.
Clutch for 5-Ton Crane, Friction, 348.
Coal Storage Plant at Port Richmond, Philadelphia, 257.
Coal, The Proximate Analysis of, 374.
Compound Locomotive on the Paris, Lyons, and Mediterranean Railway, 29.
Compressor for Hydrogen Gas, 430.
Contributions to Practical Railroad Information, Method of Determining Ammonia in Ammonium Chloride, 72.
Contributions to Practical Railroad Information, Method of Determining Specific Gravity of Oils and Other Liquids, 449.
Counterbalance in Locomotive Drive-Wheels Upon the Pressure between the Wheel and the Rail, An Experimental Study of the Effect of the, 36.
Crane, Baltimore and Ohio Railroad, Five-Ton Steam, 253.
Crane, Central Vermont Railroad, Yard, 419.
Crank-Pin Turning Machine, Portable, 188.
Crosshead, Begtrup's Engine, 96.
Cylinder for Class P Locomotive Pennsylvania Railroad, 232.
Cylinder for Engines, Motors, or Compressors, 189.

Davis, Edward F. C., 429.
Dayton, Gas Engine, The, 476.
Deterioration of Locomotive and Marine Boilers due to Expansion, and the Means of Lessening the Same, The, 133, 165, 213.
Differential Power Working Head for Deep-Well Pumps, 554.
Dome Base, Pennsylvania Railroad, Pressed Steel, 254.
Down-Draft Furnace for Steam Boilers, The, 369.
Draft Sheets, 488.
Dredging Steamer "General C. B. Comstock," United States, 527.
Dynamite Guns, The Fuse for the Pneumatic, 375.

Electric Railways in Maryland, 411.
Emery from Polishing Wheels, Apparatus for removing, 470.
Engine for the Steam Yacht "Wapiti," Triple-Expansion for the, 19.
Engine, Hobart's Steam, 431.
Electric Motor in a Boiler Shop, The, 180.
Engine, Mundy's Hoisting, 189.
Engine, Schmidt's Double-Acting Steam, 240.
Engine, Schmidt's Superheated Steam Boiler and, 89.
Exhaust Pipes and Smoke Stacks, The Most Advantageous Dimensions for Locomotive, 516, 541, 559.

Farnsworth's Gas-Compressing Pump, 94.
Fay's Engine Valve, 168.
Feed-Water Heater, Nordberg's, 432.
Flint and Père Marquette Shops and Passenger Station at Saginaw, E. S. Michigan, The, 13.
Flue Welding Plant, 409.
Flying Machine, Lilienthal, 434.
Flying Machine, Pilcher's, 491.
Fly-Wheel Accident in Hoboken, A, 493.
Four-Wheeled Bogie Engine, The History of the, 70.
Friedeberg Apparatus for Burning Coal Dust, The, 121.
Fuel Economy in Locomotives, Possible Sources of, 101.
Fuel Gas, Conducted by the Southern Pacific Company at Sacramento, Cal., Some Tests with, 302.
Furnace for Steam Boilers, The Down-Draft, 369.
Fuse for the Pneumatic Dynamite Guns, The, 375.

Gas-Compressing Pump, Farnsworth's, 94.
Gas Engine, The Dayton, 476.
Gas Motor in Dresden, The, 319.
Grease Cup, Penberthy, 334.

Hargrave's Recent Experiments, 193.
Hay-Band Spinning Machine, 472.
Henszey's Improved Locomotive, 505.
Hinckley Slack Adjuster for Railroad Car Brakes, 95.
Hogan Water-Tube Boiler, The, 237.
Hoisting Engine, Mundy's, 189.
Horizontal Drilling, Tapping, and Stud-Inserting Machine, 283.
Hose, Rubber, 380.
Hydraulic Motor, Rotary, 191.
Hydrogen Gas Apparatus for the United States Signal Service, 46.

"Indiana," The United States Battleship, 543.
Indicator-Card Takers, A Device of Value to, 446.
Indicator Rigging for Locomotives, 493.
Injector, 191.
Injector, Brownley Double Tube, 334.
Injector, The International, 187.
Inspection Car, A Steam, 25.

Japanese National Industrial Exhibition at Kioto The, 397.
Japanese Warships, 18.
Joughins' Railroad Car-Truck, 508.
Joy Valve Gear, The, 130.

Kite, The War, 433.
Kleman Nut Lock, 476.

Lathe, Bogert's 28-in. Turret Engine, 286.
Lathe, Philadelphia & Reading Railroad, Pipe, 366.
Laval Steam Turbine, The, 405.
Laval Steam Turbine, The, 453.
Lilienthal Flying Machine, 434.
Link Grinding Machine, Grand Trunk Railway, 231.
Link, Warren's Improved, 110.
Locomotive, An Early Norris Express, 87.
Locomotive, Bulla's, 239.
Locomotive Drive-Wheels upon the Pressure between the Wheel and the Rail, An Experimental Study of the Effect of the Counterbalance, 36.

Transportation Lib

Locomotive Driving Axle on the Great Northern Railway of England, The Breakage of a, 522.
Locomotive Firebox, Bork's Brick-Lined, 87.
Locomotive for the Carnegie Steel Company, Switching, 549.
Locomotive for the Concord and Montreal Railway, Passenger, 270, 318.
Locomotive for the Chicago, Burlington and Quincy Railroad, New Express Passenger, 569.
Locomotive for the Cross Creek Coal Company, Switching, 315.
Locomotive for the Mexican Railway, Freight, 207.
Locomotive for the New York and Brooklyn Bridge, Tank, 473.
Locomotive for the Prussian States Railroad with Front Steam Truck, Eight-Wheeled Compound, 352.
Locomotive for the Royal Swedish State Railway, Eight-Wheeled Passenger, 524.
Locomotives for the St. Gothard Railroad, New Compound, 419.
Locomotive for the State Railways of Chili, Compound, 461.
Locomotives for the State Railways of Hanover, Express Passenger, 262.
Locomotive, Henzey's Improved, 505.
Locomotive, Lehigh Valley Railroad Superintendent's, 27.
Locomotive on the Lake Shore and Michigan Southern Railway, High-Speed, 520.
Locomotive on the Paris, Lyons and Mediterranean Railway, Compound, 29.
Locomotive "Planet," The, 12.
Locomotives for the St. Gothard Railway, 119.
Locomotives from the Rogers' Locomotive Works, New, 83.
Locomotives, Possible Sources of Fuel Economy in, 101.
Locomotive, Sonderman's, 556.
Locomotive, The First Steam, 523.
Locomotive, The History of the Four-Wheeled Bogie, 79.
Logging Railroads, 77.

"Maine," The United States Armored Cruiser, 125.
Master Car Builders' Convention, The, 305.
Mast Traveller for Erecting Heavy Work, 129.
Method of Determining Flashing and Burning Points of Combustible Liquids, 201.
Micro-Metallography of Iron, 366.
"Minneapolis" and "Columbia," The United States Armored Cruisers, 410.
Monobar Conveyor Chain, The, 504.
Moore's Vertical Water-Tube Boiler, 238.
Mortar Carriages, A Shipment of, 84.
Mortising and Boring Machine, Improved Hollow Chisel, 477.
Mosher Steam Separator, 477.
Mumford's Water-Tube Boiler, 239, 417.

Norris Express Locomotive, An Early, 87.
Nut Lock, The Kleman, 476.

Parachute, A Guidable, 290.
Parachute, A New, 289.
Penberthy Grease Cup, 334.
Pipe Lathe, Philadelphia & Reading Railroad, 366.
Pittsburgh Locomotive Works, The, 501.
Pilcher's Flying Machine, 491.
Pilcher's Soaring Machine, 387.
Pile Driving, Water-Jet, 280.
"Planet," The Locomotive, 12.
Planing and Matching Machine, New Large Six-Roll Double Cylinder, 380.
Pneumatic Guns, Tests of the, 174.
Pony Truck by H. K. Porter & Co., 577.
Propeller, Pagan's, 554.
Punch, Combined Screw and Hydraulic, 144.

Railroads, Logging, 77.
Railways and Engineering in Japan, 67.
Resaw, The Ideal, 379.
Resistance in Water and in Air, Curve of Least, 279.
Richards' Rotary Tool-Holder, 532.
Riveted Joints, 330.
Rohan's Steam Generator, 507.
Rope and Belt Transmission, 494.
Roundhouse at Reading, 396.

Sand Shed at Hornellsville, New York, Lake Erie and Western Railroad, 203.
Saw, A Large Cutting-Off, 188.
Scale-Testing Car, Philadelphia and Reading Railroad, 267.
Schmidt's Double-Acting Steam Engine, 240.
Schmidt's Superheated-Steam Boiler and Engine, 89.
See's Water-Tube Boiler, 508.
Semaphore Signal Illuminated, 480.
Separator, Mosher Steam, 477.
Separator, Steam, 189, 335.
Siberian Railroad, The Great, 221, 447.
Siberian Railroad, Views on the Western, 27.
Signal Post, Railway, 477.
Slack Adjuster for Railroad Car Brakes, Hinckley, 95.
Slack Adjuster, McKee, 288.
Snapshot at a Gull, 97.
Soaring Experiments, 51.
Soaring Machine, Pilcher's, 387.
Steam Generator, Rohan's, 507.
Steam Separator, 189.
Steam, Some Tests Relative to the Production of, 20.
"St. Louis," The Steamship, 300.
"St. Paul," The Steamship, 497.
Superheated Steam in Electric Light Stations, 229.
Superintendent's Engine, Lehigh Valley Railroad, 27.

Taps for Cutting Threads for Stay-Bolts, 222.
Taylor's Car Wheel, 508.
Testing Machine, Riehle United States Standard Automatic, 503.
Throttle and Steam-Pipe Grinders, 487.
Throttle Valve, Pennsylvania Railroad, 122.
Tool Grinder, The Dickerman, 504.
Tool-Holder, Richards' Rotary, 532.
Tools for Turning and Cutting Off Piston Packing Rings, 444.
Torpedo Boat for the United States Cruiser "Maine," Third-Class, 363.
Torpedo Boats, Machinery for the New United States, 465.
Torpedo Effect, 9.
Tram Fastenings, 447.
Truck, Car, 479.
Truck, Joughins' Railroad Car, 508.
Tubes, Physical Reason for Rapid Corrosion of Steel Boiler, 157.

United States Armored Cruiser "Maine," The, 125.

Valve, Fay's Engine, 168.

Warren's Improved Link, 110.
Warships, Japanese, 18.
Water-Jet Pile Driving, 280.
Water Motor, Rotary, 191.
Water-Tube Boiler, 189.
Water-Tube Boiler, Boyer's Sectional, 238.
Water-Tube Boiler, Moore's Vertical, 238.
Water-Tube Boiler, Mumford's, 239.
Water-Tube Boilers, 377.
Water-Tube Boilers and their Application to War Vessels, 33, 69.
Water-Tube Boilers, Some Facts Relating to Certain Types of, 159, 217, 260.
Water-Tube Boiler, The Hogan, 237.
Western Siberian Railway, Views on the, 79, 129.
Wheel Construction, An Example of, 451.
Wheel, Taylor's Car, 508.
Wrecking Car, Central Vermont Railroad, 367.
Wrecking Crane, Philadelphia and Reading Railroad, 171.
Wrench, The Wright, 504.

Yard Arrangements along Heavy-Traffic High-Speed Railroads, 112, 176, 227.

EDITORIALS.

Aeronautics, 1.
An Everlasting Fallacy, 1.
Announcement, 437, 557.
American Guns and Armor in South America, 197.
Armor Plate Contract for Russia, 1.

Baldwin-Westinghouse Coalition, 437.
Battleship *versus* Cruiser, 53.
Battleships *versus* Cruisers, 101.

Carnegie Company's Luck, 53.
Car Ventilation, 509.
Compound Locomotives, 245.
Conduit Systems, 533.
Conventions, 293.

Dead Weight, 389.
Deterioration of Locomotive Boilers through the Effects of Expansion, 101.
Down-Draft Furnaces, 341.

Electric Locomotive on the Baltimore & Ohio R. R., The, 342.
Electric Railways, 533.
Engineer Officers in the Navy, 509.
Engine Performance, Economical, 341.

Fire-Brick Firebox, 533.
Fireproof Construction of Battleships, 53.
Fuel Consumption by Locomotives, 55.
Fuel Economy in Locomotives, Possible Sources of, 101.
Furnaces, Down Draft, 341.

Gas and Steam Engine Combined, 241, 245.

"Indiana," The U. S. Battleship, 485.
International Exhibitions, 149.
International Railway Congress, The, 342.

Library, The Need of a Good Engineering, 485.
Locomotive, Eight-Wheeled Coupled "Goods," 197.
Locomotive on the Baltimore & Ohio R. R., The Electric, 342.
Locomotive Running Shed, 557.
Locomotives with Single Drivers on the Philadelphia & Reading Railroad, 389.
Locomotives, Compound, 245.
Locomotive Returns, 152.
Locomotives, Fuel Consumption by, 55.
Locomotives, Possible Sources of Fuel Economy in, 101.
Locomotives, Two Notable, 295.

Mail Contract for the St. Louis, 389.
Mathematical Papers, 438.
Mechanical Engineers, The Annual Meeting of the, 2.
Monthly Meeting of Mechanical Engineers, 437.

Narrow-Gauge Delusion, The, 149.
National Manufacturers' Association, 440.

Raillery, 438.
Railroad Racing, 509, 534, 557.
Rapid Transit, 149.
Rules of Interchange for the Master Car Builders' Association, 1.
Rules of Car Interchange, Modification of the, 101.
Rules of Interchange, 197, 293.
Running Expenses Due to Increase of Weight of Passenger Cars, 293.

Scientific Schools in Germany, 197.
Scrap Pile, The, 53.
Shipbuilding in the United States, 197.
Shot on Turret, Effect of, 437.
Squadron Evolution of the U. S. Navy, 197.
Standard Sizes of Publications, 245.
Storage Batteries, 557.
"St. Paul," The Steamer, 485.

Throttling *versus* Expansion Governing, 245.
Trade Catalogues, 439.
Tubes, Corrosion of Steel, 149.
Turrets, on Battleships, Location of, 341.

Unstable Warships, 53.

Ventilation, Car, 509.

Water-Tube Boilers in Warships, 53.

NEW PUBLICATIONS.

Adams Boiler Co., The, 200.
Aerial Flight, 292.
Aerial Navigation, 52, 148.
Aerial Navigation, Report on, 292.
Aeronautical Annual, The, 59, 147, 196.
Aeronautics, Experiments in, 52, 196.
Air-Brake, Evolution of the, 391.
Air or Gas Compressors Driven by Corliss Engines, 297.
Alteneder & Sons, Catalogue and Price List of, 344.
Alternating Electric Currents, 537.
American Institute of Electrical Engineers, Transactions of the, 343.
American International Association of Superintendents of Bridges and Buildings, Proceedings of the Fourth Annual Meeting of the, 297.
American Railway Association, Proceedings of the Meeting of the, 297.
American Railway Master Mechanics' Association, The Report of the, 391.
American Society of Civil Engineers, 297.
American Society of Mechanical Engineers, Transactions of the, 155.
Scientific Lectures, Popular, 155.
American Society of Naval Engineers, Journal of the, 155.
Ammonia Refrigeration, Theoretical and Practical, 153.
Arbitration and Conciliation, Annual Report of the State Board of, 199.
Association of Civil Engineers of Cornell University, Transactions of the, 392.
Atmospheric Resistance, 148, 196.
Aviators and Aeronauts, A Manual for the Practical Use of, 340.
Ayer, Henry C., and Gleason Co., 5.

Baker Car Heater, The Fire-Proof, 200.
Baker Hot Water Non-Freezing Car Heaters, 444.
Band Re-Saws, The Use and Care of, 392.
Barrus' Universal Steam Calorimeter 1895 Pattern, 537.
Beeson's Inland Marine Directory, 297.
Boiler, Design, Construction and Maintenance of a Marine, 343.
Boring and Turning Mills, 393.
Brass Pipe for Plumbing, 155.
Brotherhood of Railroad Trainmen, Souvenir, 250

Cable Railway and Some Other Devices Employed by Contractors on the Chicago Main Drainage Canal, The Travelling, 538.
Cahall Vertical Water-Tube Boiler, The, 299.
Calendars, 59.
Canal Commission of Philadelphia, Report of the, 392.
Car Buyer's Helper, 513.
Cast-Iron Chilled Car Wheels, 200.
Central American Rainfall, 199.
Central Railway Club, Proceedings of the, 297.
Catechism of Car Painting, 3.
Coal Handling for Steam Generation, 514.
Cold Saw Cutting-Off Machines, Catalogue of, 443.
Combine Safety Water-Tube Boiler, 297.
Commissioners of Labor, Eighth Special Report of the, 537.
Commissioner of Labor, Seventh Annual Report of the, 199.
Compressed Air, 6.
Compressed Air and the Clayton Air Compressors, 393.
Condensing and Non-Condensing Engines Applied to Rolling Mills, 393.
Consolidated Car Heating Co., 5.
Corbitt & Burnham, 537.
Corliss Steam Engines, 513.
Correspondence School of Technology, The, 512.
Crane to his Workmen, Address of R. T., 442.
Crawley Combined Steam Jacket, Feedwater Heater, Filter, Purifier, Oil Extracter and Condenser, 250.
Crosby Steam Gauge and Valve Co., 537.

Dayton Railroad Crossing Gate, 115.
Development and Trasmission of Power from General Stations, On the, 58.
De Witt Wire Cloth Co., The, 200.
Dixon's Pure Flake Graphite, The Boys have Something to Say about, 512.
Duration and Lateral Extent of Gusts of Wind and the Measurement of their Intensity, On the, 52.
Dynamo Electric Machinery, The Practical Application of, 537.

Economy Guarantees of Engines, 299.
Economy Water-Tube Boiler, 299.
Eddy Tailless Malay Kites, The, 52.
Elasticitaet und Festigkeit, 104.
Electrical Journal, The, 296.
Electric Elevators, 299.
Electric Lighting Plants, Their Cost and Operation, 4.
Electric Storage Battery Co., 512.
Elementary Principles of Mechanics, The, 104.
Elements of Mechanical Drawing, 4.
Elephant Brand, Phosphor Bronze and other Alloys, 251.
Engine and Boiler Room, 297.
Engineering Contracts and Specifications, 537.
Engineering Education, Proceedings of the Second Annual Meeting of the Society for the Promotion of, 199.
Engineering News, 391.
Engineering Translations, 537.
Engineers' Pocket Book and Diary, The Practical, 537.
Engine Room, An Ideal, 392.
Engines, Construction of Stationary and Marine Steam, 343.
Evolution of a Switchboard, 59.
Experimental Study of Field Methods which Will Insure to Stadia Measurements Greatly Increased Accuracy, An, 343.

Facts Worth Knowing about Pressure Regulators (Reducing Valves) and Pump Governors of Practical Value to all Steam Users, 106.
Fay & Co., 513.
Ferracute Machine Co., The, 200.
Files, Rasps and Tools, 108.
Finlayson Upright Water-Tube Boiler for Marine and Land Use, 6.
Flying Apparatus, 196.
Flying Machine, A New, 196.
Flying Machines, 196.
Flying Machines, Progress and Development of, 196.
Forbes, W. D., & Co., 512.

Geometry, Elements of Descriptive, 537.
Gisholt Machine Co., The, 200, 512.
Goubert Feed-Water Heater, The, also Engine Condenser and Distilling Condenser, 106.
Graphite as a Lubricant, 59.

Heine Safety Boiler Co., 537.
High Pressure Steam, 514.
Hurlburt-Rogers Machine Co., The, 200.
Hydraulics, A Treatise on, 537.
Hydraulic Screw and Lever Jacks, Price List of, 513.

Immigration and Passenger Movements at the Ports of the United States for the Year Ending June 30, 1894, 199.
Indicator Diagrams and Engine and Boiler Testing, 199, 249.
Indicator with Reference to the Adjustment of Valve Gear in all Styles of Engines, Practical Application of the, 154.
Industrial Railways for Manufacturing Establishments. 251.
Interstate Commerce Commission, Eighth Annual Report of the, 155, 199.
Iron Roof, The Life of an, 537.

Keuffel & Esser Co., The Catalogue and Price List, 106.

Le Siège de Paris, vu à Vol d'oiseau, 292.
Lettering of Mechanical Drawing, 5.
Le Vol Saute, 512.
Light, 344.
Light Cars, Sheffield Car Company, 393.
Locomotion in Air, 52.
Locomotive Engineering, 56.
Locomotives, A Manual of Instruction for the Economical Management of, 199.
Locomotives for Locomotive Engineers and Firemen, A Manual of Instruction for the Economical Management of, 248.
Lodge & Shipley Machine Tool Co., The, 155.
Lukens Iron and Steel Co., 155.

Mechanical Engineers' Pocketbook, The, 250, 296.
Mechanical Rubber Goods, 299.
Machinery, Tools and Castings, Standard Rules, Cast Steel, Try Squares, Wire Gauges and Tools for Accurate Measurements, Catalogues and Price Lists of, 513.
Machine Tools, Catalogue of, 59.
Machine Tools for Working Metal, Illustrated Catalogue and General Description of Improved, 157.
Madagascar, Test of the Steamer, 5.
Manning Boilers, Concerning, 156.
Markets in Rome, On the Covered, 4.
Marks' Patent Artificial Limbs with Rubber Hands and Feet, 155.
Master Car and Locomotive Painters' Association, Proceedings of the Twenty-fifth Annual Convention, 4.
Master Car Builders' Association, Report of the Proceedings of the Twenty-ninth Annual Convention of the, 442.
Maxim, An Interview with Mr., 52, 196.
Mechanical Flight, 52.
Mechanical Flight, A Problem in, 52.
Memoranda Regarding Rapid Transit Routes, 59.
Memphis Bridge, The, 106, 153.
Michigan Engineers' Annual, The, 443.
Military Engineering of the International Congress of Engineering, Operations of the Division of, 250.
Mining, Milling and Smelting Machinery, Reynolds' Corliss Engines, Illustrated Catalogue of, 344.
Monolithic Subways, 513.
Morrison Suspension Furnaces, 200.
Motive Powers and their Practical Inspection, 199, 250.
Murray & Tregurtha, 200.

National Convention of Railroad Commissioners, Proceedings of a, 297, 343.
New England Railroad Club, Proceedings of the, 297.
New York Railroad Men, 55.
Nicholson File Co., The, 200.
Northern Pacific Railroad, Sketches of the Wonderland Penetrated by the, 251.
Norton Improved Ball-Bearing Ratchet Screw Jacks, The, 106.
Notes on Government Railroads, 5.
Notes on the Year's Naval Progress, 59.
Nystrom's Pocket-Book of Mechanics and Engineering, 248.

Oakes Scheme, The, 196.
Official Railway List, The, 299.
Omaha, Annual Report of the City Engineer of the City of, 199.
Operating Expenses, Classification of, 392.
Operating Expenses, Decisions upon Questions Raised under the Classification of, 392.

Painting of Metallic Surfaces, 537.
Peerless Rubber Manufacturing Co., The, 344.
Pelton Water Wheel, Embracing in its Variations of Construction and Application the Pelton System of Power, The, 156.
Pencoyd Iron Works, 297.
Pennsylvania Railroad Men's News, 3.
Phœnix Iron Works Co., 6.
Pilot File System, 344.
Pitts Agricultural Works, 5.
Pittsburgh Crushed Steel Co., 5.
Planimeter, The Willis, 391.
Pneumatic Power and Motor Company of New York, The, 156.
Pocket List of Railroad Officials, The, 152.
Poor's Directory of Railway Officials, 3.
Poor's Manual of the Railroads of the United States, 512.
Position Diagram of Cylinder with (Meyer) Cut-Off at 1/8, 1/4, 3/8, and 1/2 Stroke of Piston, 343.
Power Brakes *versus* Hand Brakes, 199.
Power Developed in the Cylinders of Compound Engines, Rules and Tables for the Equalization of, 393.
Practical Application of the Indicator, 59.
Practical Notes on Rope-Driving, 4.
Practice and Theory of the Injector, 59, 105.
Pressure of Wind, 52.
Prince Manufacturing Co., The, 200.
Proceedings of the International Conference on Aerial Navigation, 100.
Proceedings of the International Electrical Congress, 59, 105.
Proofs of Servis, 300.
Protection of Grade Crossings of Steam Railroads with Electric Railways and Protection of Facing Point Switches, 344.
Pumping Engine for the Louisville Water Company, Duty Trial, 247.
Pumping Machinery, Catalogue No. 19 of Steam, 60.
Pumps and Hydraulic Machinery for Every Service, Illustrated Catalogue and Price List of, 156.
Punching and Shearing Machinery, 537.

Q. & C. Company, 200.
Queensland Railway Commissioner, Report of the, 537.
Quint's Turret Drills, Illustrated Catalogue of, 513.

Radiators for Steam and Hot Water, Catalogue of M. Bundy, 59.
Railroad Commissioners of the State of Massachusetts, Twenty-Sixth Annual Report of the, 199.
Railway Officials, Universal Directory of, 442.
Railways in India for 1893-94, Administration Report on the, 155.
Rankine's Civil Engineering, Notes on, 296.
Recent Air and Gas Compressors, 107.
Red Lead and How to Use It, 443.
Refrigerating and Ice-Making Machinery, 513.
Rensselaer Polytechnic Institute, History of, 247.
Resistance of a Fluid to a Plane Kept Moving Uniformly in a Direction Inclined to it at a Small Angle, On the, 52.
Riehle Bros. Testing Machine Co., 200.
Robinson Radial Truck, 537.
Rope Driving, 536.
Royal Engineers, Professional Papers of the Corps of, 199.

Safety Valve, The, 512.
St. Charles Car Co., Catalogue of, 60.
St. Louis Corliss Engine, The, 537.
St. Louis Iron and Machine Works, The, 200.
Sargent Company Railway Brake Shoes, 6.
Science, 4, 104.
Screw Propellers and Marine Propulsion, 199.
Screw Propeller and Marine Propulsion, The, 248.

NEW PUBLICATIONS.

Shortt Engine Co., The, 200.
Slide Rule, The, 247.
Slide Valve and Link Motion to Stationary, Portable, Locomotive and Marine Engines, with New and Simple Methods for Proportioning the Parts, The Practical Application of the, 536.
Southern and Southwestern Railroad Club, Proceeding of the, 297.
Speidel's Patent Economic Safety Hoists, 299.
Springs for Street Railways, Catalogue of, 392.
Standard Evaporation Computer, 299.
Steam Engine and Other Heat Engines, The, 248.
Steam Engineers, Modern Examinations of, 536.
Steam Engines and Boilers, An Elementary Text-Book on, 442.
Steam Engines Described and Illustrated, High-Speed Automatic, 513.
Steam Plants for Driving Dynamos in Electric Light, Railway and Power Stations, and Isolated Plants, etc., 299.
Steam Tables and Engine Constants, Pray's, 537.
Steel Construction of Buildings, 50.
Sterling Emery Wheel Manufacturing Company, The, 392.
Sterling Gasoline Traction and Portable Engines, The, 250.
Storage Heaters for Railway Carriages, Patent, 200.
Stow Manufacturing Co., 60.
Street Railway Investments, 155.
Surface Grinding and Polishing Machinery, 512.

Tables of Diameters, Areas, Weights, etc., of Cold-Drawn Seamless Tubing, 3.
Tarifs des Voyageurs, Les Reformes des, 154.
Technical Society of the Pacific Coast, Transactions of the, 537.
Theory and Construction of a Rational Heat Motor, 57.
Ties and on Preservative Processes and Metal Tie Plates for Wooden Ties, Report on the Use of Metal Railroad, 343.
Tin in Various Parts of the World, The Production of, 537.
Tinker Patent Storm Window for Locomotive Cabs, Pilot Houses, etc., 5.
Tissandier the Balloonist, Gaston, 292.
Tobin Bronze, 444.
Tradesman Annual, The, 56.
Transition Curves, 3.

Union Grease Company, 250.
Union Switch and Signal Co., A Catalogue of the Devices and their Parts Manufactured by the, 156.
United States Metallic Packing Co.'s Price List, 513.
United States Naval Institute, Proceedings of the, 155, 392.

Van Nostrand Company, D., 200.
Venturi Metre, The, 59.

Wainwright Steam Appliances, The, 299.
Water for Sanitary and Technic Purposes, Examination of, 443.
Water, Measuring, 537.
We-fu-go Process of Purifying Feed-Water for Steam Boilers, Heaters, etc., The, 299.
Western Railway Club, Proceedings of the, 297.
Williams Central Valve Engine, 344.
Wind Pressure in Engineering Construction, 292.
Wind Pressures, Recent Experiments on, 292.
Wood Wheels Grinding and Polishing Machinery, 443.

MISCELLANEOUS ARTICLES.

Accidents to Locomotive Engineers and Firemen, 43, 61, 91, 136, 183, 234, 282.
Aerial Advertising, 385.
Aerial Navigation, Longitudinal Stability in, 338.
Aerial Navigation, On the Problem of, 45, 99.
Aerial Navigation, The United States Senate on, 291.
Aerial Railways, 75.
Aerial Yacht, An, 384.
Aeronautics, Experiments in, 290.
Aeroplane, A Simple, 484.
Aeroplane Stability during Flight, 481.
Ahren's Steam Boiler, 506.
Air Currents, Velocity of, 385.
Air Hoist for Locomotive Pits, 408.
Air Propeller, A New, 385.
Air Propellers, Some Experiments on the Efficiency of, 241.
Air Pumps for the United States Battleship "Texas," 312.
Alternating Current Electric Railways, 539.
American Locomotives Built in England, Early, 32.
American Railway Master Mechanics' Association, The Convention of, 325.
Among the Shops, 499.
Among the Shops, West Philadelphia, 408.
Angle-Shearing Machine, A Double, 529.
Arbitration, Compulsory, 186.
Armstrong Pipe-Threading and Cutting-Off Machine, No. 2½, 94.
Automatic Longitudinal Stability, 145.
Atlanta Exposition, The, 572.

Baldwin-Westinghouse Coalition, The, 423.
Balloon Ascensions, High, 337.
Balloon Ascension, The Highest, 194.
Balloon at the Champs de Mars, A Captive, 578.
Balloons, Captive, 45.
Balloons, United States War, 98.
Balloon, The Proposed French Captive, 337.
Ball Reamers, Special Tool for Turning, 369.
Baltimore and Ohio Railroad Company, First Annual Report of the Directors to the Stockholders of the, 27.
Beam Compass, The Alteneder, 431.
Begtrup's Engine Crosshead, 96.
Blowers, Green's Rotary, 190.
Boiler, 192.
Boiler, Ahren's Steam, 506.
Boiler and Engine, Schmidt's Superheated Steam, 89.
Boiler and Superheater, Combined Tubular, 335.
Boiler, A New Style of Portable, 285.
Boiler Attendants, Instructions to, 24.
Boiler, Boyer's Sectional Water-Tube, 238.
Boiler-Cleaning Device, Smith's, 431.
Boiler for Class P Locomotive, Pennsylvania Railroad, 311.
Boiler, Moore's Vertical Water-Tube, 238.
Boiler, Mumford's Water-Tube, 239.
Boiler, Normand and Sigandy's Water-Tube, 555.
Boiler, Pierpoint's Water-Tube, 554.
Boiler, See's Water-Tube, 508.
Boiler, Steam, 478.
Boilers and their Application to War Vessels, Water-Tube, 33, 69.
Boilers and Vessels of War, 309.
Boilers, Arrangement of Furnace for Locomotive-Form, 471.
Boilers for Warships, Water-Tube, 497.
Boilers Due to Expansion and the Means of Lessening the Same, The Deterioration of Locomotive and Marine, 133, 165, 213.
Boilers in the French Navy, Tubulous, 359.
Boilers, Some Facts Relating to Certain Types of Water-Tube, 159, 217, 260.
Boilers, Truths to Know when Buying, 345.
Boilers, Water-Tube, 377.
Boiler, The Combine Water-Tube, 285.
Boiler, The Hogan Water-Tube, 237.
Boiler Tubes, Physical Reasons for Rapid Corrosion of Steel, 157.
Boiler, Water-Tube, 189.
Bolster for Bodies and Trucks of Freight Cars, The Diamond Pressed Steel, 237.
Boring Locomotive Cylinders, Mechanism for, 142.
Bork's Brick-Lined Locomotive Firebox, 87.
Boyer's Sectional Water-Tube Boiler, 238.
Brake Shoes, Road Tests of, 306.
Brick-Lined Firebox, The Docteur, 545.
Brownley Double-Tube Injector, 334.
Bulla's Locomotive, 239.

Camp-Meeting, A Plan for an Aeronautical, 146.
Captive Balloons, 45.
Car, A Steam Inspection, 25.
Car of 60,000 Lbs. Capacity for the Grand Trunk Railway, Standard Box, 461.
Car, Lehigh Valley Railroad, Hopper Gondola, 359.
Car, Railway, 478.
Cars on the Southern Pacific Railroad, Standard, 400.
Cattle Guard, The Sheffield, 382.
Checking Machine, Belt Rail, Grand Trunk Railway, 498.
Check Valve, 335.
Chicago Agreement, The, 305.
"Cincinnati," The Cruiser, 171.
Coal Car Sides, 308.
Coal Storage Plant at Port Richmond, Philadelphia, 257.
Coal, The Proximate Analysis of, 374.
Cold Test and Chilling Point of Oils and Other Liquids, Method of Taking, 332.
Compound Locomotive on the Paris, Lyons and Mediterranean Railway, 29.
Compound Locomotive on the Rock Island Railroad, Test of a Richmond Locomotive Works, 382.
Compound Locomotives, The Efficiency of, 270.
Compressed Air in Foundries, The Use of, 85, 357.
Compressed Air, The Uses of, 85.
Compressor of Hydrogen Gas, 430.
Contributions to Practical Railroad Information, 332.
Contributions to Practical Railroad Information, Method of Determining Ammonia in Ammonium Chloride, 72.
Contributions to Practical Railroad Information, Method of Determining Specific Gravity of Oils and Other Liquids, 449.
Contributions to Practical Railroad Information, Method of Determining Tar and Tar Acids in Wood Preservative, 33, 255.
Co-operation, 456.
Counterbalance in Locomotive Drive-Wheels upon the Pressure between the Wheel and the Rail, An Experimental Study of the Effect of the, 36.
Crane, Baltimore and Ohio Railroad, Five-Ton Steam, 253.
Crane, Central Vermont Railroad Yard, 419.
Crank-Pin Turning Machine, Portable, 188.
Cylinder for Class P Locomotive, Pennsylvania Railroad, 232.
Cylinder for Engines, Motors or Compressors, 189.

Davis, The Death of Edward F. C., President of the American Society of Mechanical Engineers, 429.
Dayton Gas Engine, The, 476.
Dean Compound, A Ride on, 429.
Definitions Wanted, 396.
Deterioration of Locomotive and Marine Boilers Due to Expansion, and the Means of Lessening the Same, The, 133, 165, 213.
Differential Power Working Head for Deep-Well Pumps, 554.
Down Draft Furnace for Steam Boilers, The, 369.
Dredging Steamer "General C. B. Comstock," United States, 527.
Dynamite Guns, Fuse for the Pneumatic, 375.

Early Days of the Iron Manufacture, 62.
Electrical Railroading, Some Difficulties of, 563.
Electricity at the Paris Exposition of 1900, 490.
Electric L Railways in Maryland, 411.
Electric Motor in a Boiler Shop, The, 180.
Electric Motor in the Machine Shop, The, 113.
Electric Motors in the Southwark Foundry and Machine Company's Shops, 203.
Electric Weed-Killer, 202.
Emery from Polishing Wheels, Apparatus for Removing, 470.
Engine for the Steam Yacht "Wapiti," Triple-Expansion, 19.
Engine, Hobart's Steam, 431.
Engine, Mundy's Hoisting, 189.
Engine, Schmidt's Double-Acting Steam, 240.
Engine, Schmidt's Superheated-Steam Boiler and, 89.
Engines, Pressure and Impulse in Motive E, 117.
Engines, Trials of Oil, 393.
Exhaust-Pipes and Smoke Stacks, The Most Advantageous Dimensions for Locomotive, 516, 541, 559.

Farnsworth's Gas-Compressing Pump, 94.
Fay's Engine Valve, 168.
Feed-Water Heater, Nordberg's, 432.
Fire-box Sheets, The Bulging of, 326.
Fire Kindlers, 335.
Firemen on Railroads, Employment of, 84.
Flight of Buzzards, 51.
Flint and Père Marquette Shops and Passenger Station at Saginaw, E. S. Michigan, 13.
Flue Welding Plant, 409.
Flying Experiments, 97.
Flying Machine, Lilienthal, 434.
Flying Machine, Pilcher's, 491.
Flying Machine, The Lilienthal, 193.
Flying Machine, Wellner's, 49.
Fly-Wheel Accident in Hoboken, A, 493.
Foreign Naval Notes, 11.
Forty Miles Deep, 532.
Four-Wheeled Bogie Engine, The History of the, 79.
Friedeberg Apparatus for Burning Coal Dust, The, 121.

MISCELLANEOUS ARTICLES.

Fuel Gas, Conducted by the Southern Pacific Railway Company at Sacramento, Cal., Some Tests with, 302.
Furnace for Steam Boilers, The Down-Draft, 369.
Fuse for the Pneumatic Dynamite Guns, 375.

Gas-Compressing Pump, Farnsworth's, 94.
Gas-Engine as an Auxiliary, The Storage Battery or the, 576.
Gas Engines, 208.
Gas-Engine, The Dayton, 476.
Gas-Motor in Dresden, 319.
Gas-Motor Street Car in Service in Germany, The, 126.
Gauges for Sheet Metal Tubes and Wire, 327.
Grand Trunk Shops at Montreal, 469.
Grease Cup, Penberthy, 334.

Hargrave's Recent Experiments, 193.
Hay-Band Spinning Machine, 472.
Headquarters for Engineers, 538.
Heilmann Locomotive, The, 175.
Heliographic Message from British Columbia to Mexico, A, 299.
Henzey's Improved Locomotive, 505.
High Ascension of the "Phœnix" on December 4, 1894, The, 145.
Hinckley Slack Adjuster for Railroad Car Brakes, 94.
Hogan Water-Tube Boiler, The, 237.
Hoisting Engine, Mundy's, 189.
Horizontal Drilling, Tapping, and Stud-Inserting Machine, 283.
Hose, Rubber, 381.
Hydraulic Motor, Rotary, 191.
Hydrogen Gas Apparatus for the United States Signal Service, 46.

"Indiana," The United States Battleship, 543.
Indicator Car Takers, A Device of Value to, 446.
Indicator Rigging for Locomotives, 493.
Ingersoll Drills on the Chicago Drainage Canal, 580.
Injector, 191.
Injector, Brownley Double-Tube, 334.
Injector, The International, 187.
Inspection Car, A Steam, 25.
Instructions to Boiler Attendants, 24.
Interchange Agreement between Railroad Companies, 6.
International Railway Congress, The, 321.
Iron Manufacture, Early Days of the, 62.

Japanese National Industrial Exhibition at Kioto, The, 397.
Japanese Warships, 18.
Johnstone Compound Locomotive, The Efficiency of the, 111.
Joughins' Railroad Car-Truck, 508.
Joy Valve Gear, The, 130.

Kite, The War, 433.
Kleman Nut Lock, 476.

Labor Arbitration in France, 123.
Lathe, Bogert's 28-in. Turret Engine, 286.
Laval Steam Turbine, The, 405.
Laval Steam Turbine, The, 453.
Lathe, Philadelphia and Reading Railroad, Pipe, 366.
Lilienthal Apparatus in Dublin, A, 339.
Lilienthal Flying Machine, 434.
Lilienthal's Imitators, 47.
Link Grinding Machine, Grand Trunk Railway, 231.
Link, Warren's Improved, 110.
Locomotive, An Early Norris Express, 87.
Locomotive Boiler Diaphragm, Britton's, 556.
Locomotive, Bulla's, 239.
Locomotive Driving-Axle on the Great Northern Railway of England, The Breakage of a, 522.
Locomotive Driving-Wheels upon the Pressure between the Wheel and Rail, An Experimental Study of the Effect of the Counterbalance of, 36.
Locomotive Depot for the Accommodation of 180 Engines and Tenders, Description of a, 578.
Locomotive Engineers and Firemen, Accidents to, 43, 91, 136, 183, 234, 282.
Locomotive Engineers and Firemen for the Year 1894, Résumé of the Accidents to, 61.
Locomotive Fire-Box, Bork's Brick-Lined, 87.
Locomotive for the Carnegie Steel Co., Switching, 549.
Locomotive for the Chicago, Burlington and Quincy Railroad, New Express Passenger, 569.
Locomotive for the Concord and Montreal Railroad, Passenger, 270, 318.
Locomotive for the Cross Creek Coal Company, Switching, 315.
Locomotive for the Mexican Railway, 345.
Locomotive for the Mexican Railway, Freight, 207.
Locomotive for the New York and Brooklyn Bridge, Tank, 473.
Locomotive for the Prussian States Railroads with Front Steam Truck, Eight-Wheeled Compound, 352.
Locomotive for the Royal Swedish State Railway, Eight-Wheeled Passenger, 524.
Locomotive for the State Railways of Chili, Compound, 461.
Locomotive for the State Railways of Hanover, Express Passenger, 262.
Locomotive, Henzey's Improved, 505.
Locomotive, Lehigh Valley Railroad, Superintendent's, 27.
Locomotive Piston-Rods, 425.
Locomotive on the Lake Shore and Michigan Southern Railway, High-Speed, 520.
Locomotive on the Paris, Lyons and Mediterranean Railway, Compound, 29.
Locomotive on the Rock Island Railroad, Test of a Richmond Locomotive Works Compound, 382.
Locomotive "Planet," The, 12.
Locomotive Repairs, Excessive Cost of, 251.
Locomotive Returns for the Month of November, 1894, .
Locomotive Returns for the Month of October, 1894, 90.
Locomotive Returns for the Month of September, 1894, 42.
Locomotives Built in England, Early American, 32.
Locomotives for the St. Gothard Railroad, New Compound, 419.
Locomotives for the St. Gothard Railway, 119.
Locomotives from the Rogers' Locomotive Works, New, 83.
Locomotive, Sonderman's, 556.
Locomotives, The Efficiency of Compound, 280.
Locomotive, The Efficiency of the Johnstone Compound, 111.
Locomotive, The First Steam, 523.
Locomotive, The Heilman, 175.
Locomotive, The History of the Four-Wheeled Bogie, 79.
Logging Railroads, 77.

"Maine," The United States Armored Cruiser, 125.
Malleable Cast Iron, 459.
Master Car Builders' Convention, The, 305.
Mast Traveller for Erecting Heavy Work, 129.
Mechanical Engineering, A Text Book of, 56.
Meeting of Mechanical Engineers, 208.
Meteorological Observations at High Altitudes, The Value of, 289.
Method of Determining Chloride in Ammonium Chloride, 33.
Method of Determining Flashing and Burning Points of Combustible Liquids, 201.
Micro-Metallography of Iron, 366.
Migratory Flight of Birds, Speed in, 383.
"Minneapolis" and "Columbia," The United States Armored Cruisers, 410.
Monobar Conveyor Chain, The, 504.
Moore's Vertical Water-Tube Boiler, 238.
Mortar Carriages, A Shipment of, 84.
Mortising and Boring Machine, Improved Automatic Hollow-Chisel, 477.
Mosher Steam Separator, 477.
Mumford Water-Tube Boiler, 239, 417.

National Manufacturers' Association, 468.
Naval Notes, Foreign, 11.
Norris Express Locomotive, An Early, 87.
Nut Lock, The Kleman, 476.

Occupation of an Engineer, The, 565.
Oil Engines, Trials of, 393.

Parachute, A Guidable, 290.
Parachute, A New, 289.
Parachute Drop, His First, 338.
Passenger Traffic on Railways, Early, 315.
Penberthy Grease Cup, 334.
Photographs from a Kite, 339.
Piece-Rate System, Being a Step toward Partial Solution of the Labor Problem, A, 354.
Pilcher's Flying Machine, 491.
Pilcher's Soaring Machine, 387.
Pile Driving, Water-Jet, 280.
Pintsch *versus* Ordinary Illuminating Gas for Car Lighting, 283.
Pipe Lathe, Philadelphia & Reading Railroad, 366.
Piston Rods, Locomotive, 425.
Pistons, Piston-Rods and Fastenings, 329.
Pittsburg Locomotive Works, The, 501.
Planet, The Locomotive, 12.
Planing and Matching Machine, New Large Six-Roll Double Cylinder, 380.
Pneumatic Guns, Tests of the, 174.
Pony Truck by H. K. Porter & Co., 577.
Porter & Co., H. K., of Pittsburg, 499.
Powerful, H. M. S., 417.
Pressure and Impulse in Motive Engines, 117.
Progress in Flying Machines, 99.
Propeller, Pagan's, 554.
Punch, Combined Screw and Hydraulic, 144.

Race to Aberdeen, The Railway, 243.
Rack Railways, 264.
Railway Race to Aberdeen, The, 423.
Railroad Commissioners of the State of New York, Report of the Board of, 81.
Railroad Notes, 85.
Railroads, Logging, 77.
Railway Rolling Stock, 428.
Railways, Aerial, 75.
Railways and Engineering in Japan, 67.
Railways, Rack, 264.
Rapid Transit in Large Cities, 182.
Resaw, The Ideal, 379.
Resistance in Water and in Air, Curve of Least, 279.
Richards' Rotary Tool Holder, 532.
Rising, 52.
Riveted Joints, 330.
Rohan's Steam Generator, 507.
Rolling Stock, Railway, 428.
Rope and Belt Transmission, 494.
Roundhouse at Reading, 396.
Russian Engineering Notes, 79.

"St. Louis," The Steamship, 300.
"St. Paul," The Steamship, 497.
Sand Shed at Hornellsville, New York, Lake Erie and Western Railroad, 203.
Saw, A Large Cutting-Off, 188.
Scale-Testing Car, Philadelphia and Reading Railroad, 267.
Schmidt's Double-Acting Steam Engine, 240.
Schmidt Motor (Boiler Superheater and Compound Engine), Trial of a, 217.
Schmidt's Superheated Steam Boiler and Engine, 89.
Scrap Material, The Utilization of Railroad, 327.
See's Water-Tube Boiler, 508.
Semaphore Signal, Illuminated, 480.
Separator, Mosher Steam, 477.
Separator, Steam, 189, 335.
Shop Notes, 570.
Siberian Railroad, The Great, 221, 447.
Siberian Railroad, Views on the Western, 27.
Signal Post, Railway, 478.
Slack Adjuster for Railroad Car Brakes, Hinckley, 95.
Slack Adjuster, McKee, 288.
Smoke-Stacks, The Most Advantageous Dimensions for Locomotive Exhaust Pipes, 516, 541, 559.
Snapshot at an Albatross, A, 148.
Soaring Experiments, 51.
Soaring Flight, 99.
Soaring Machine, Pilcher's, 387.
Society of Marine Architects and Marine Engineers, Meeting of the, 545.
Stability, Automatic, 487.
Steam Generator, Rohan's, 507.
Steam Separator, 189.
Steam Jackets and Superheated Steam, The Economy of, 362.
Steam, Some Tests Relative to the Production of, 20.
Standard Sizes of Postal Cards, 308.
Strikes, Measures to Prevent, 122.
Storage Battery for Central Stations, The, 574.
Storage Battery or the Gas-Engine as an Auxiliary, The, 576.
Stresses in Girder and Roof Trusses, 56.
Superheated Steam in Electric Light Stations, 229.
Superintendent's Engine, Lehigh Valley Railroad, 27.

Taps for Cutting Treads for Stay-Bolts, 222.
Taylor's Car Wheel, 508.
Tehuantepec Railroad, Its Importance as a Competitor for Transcontinental Traffic, The, 350.
Testing Machine, Riehle United States Standard Automatic, 503.
Throttle Valve, Pennsylvania Railroad, 122.
Tires, Wear of Driving Wheel, 332.
Tool Grinder, The Dickerman, 504.
Tool Holder, Richards' Rotary, 532.
Torpedo Boat for the United States Cruiser "Maine," Third-Class, 363.
Torpedo Boats, Machinery for the New United States, 465.
Tram Fastenings, 447.
Truck, Car, 479.
Truck, Cliff's Freight Car, 556.
Truck, Joughins' Railroad Car, 508.
Tubes, Physical Reasons for Rapid Corrosion of Steel Boiler, 157.

United States Armored Cruiser "Maine," The, 125.

Valve, Fay's Engine, 168.
Valve-Gears, The Accuracy of, 446.
Ventilation of the Boiler Room, The, 520.
Voyage of the Balloon "Cirrus," July 7, 1894, 48.
Voyage of the Balloon "Svea," at Stockholm, Sweden, October 19, 1893, 47.

Warships, Japanese, 18.
War Vessels, Miniature, 540.
Water Hammer, 111.
Water-Jet Pile Driving, 280.
Water Motor, Rotary, 191.
Water-Tube Boiler, 189.
Water-Tube Boiler, Boyer's Sectional, 238.
Water-Tube Boiler, Moore's Vertical, 238.
Water-Tube Boiler, Mumford's, 239.
Water-Tube Boilers, 377.
Water-Tube Boilers and their Application to War Vessels, 33, 69.
Water-Tube Boilers for Warships, 497.
Water-Tube Boilers in the British Navy, 222.
Water-Tube Boilers, Some Facts Relating to Certain Types of, 159, 217, 260.
Water-Tube Boiler, The Hogan, 237.
Weed-Killer, Electric, 202.
Wellner's Flying Machine, 49.
Wellner on the Sail-Wheel Experiments, Professor, 49.

MISCELLANEOUS ARTICLES.

Western Siberian Railway, Views on the, 79, 129.
Wheel Construction, An Example of, 451.
Wheel, Taylor's Car, 508.
Wind-Measurer, Bornstein's, 339.
Windmills, Efficiency of, 339.
Wind Pressure, Experiments on, 435.
Wing, The Elasticity of the, 433.
Wrecking Car, Central Vermont Railroad, 267.
Wrecking Crane, Philadelphia and Reading Railroad, 171.
Wrench, The Wright, 504.
Yard Arrangements Along Heavy-Traffic High Speed Railroads, 112 176, 227, 253.

PERSONALS AND OBITUARIES.

Bohreer, M. H., 333.
Brevoort, Henry Lefferts, 379.
Chaffee, F. W., 184.
Clark, David, 184.
Copeland, Charles W., 140.
Davidson, M. T., 236.
Davis, Edward F. C., 429, 474.
Emmert, J. H., 379.
Fagan, W. W., 379.
Flint, Peter, 235.
Hammond, R. R., 379.
Harrison, W. H., 333.
Hodges, H. B., 532.
Keller, E. E., 474.
Mahl, F. W., 184.
Mann, Captain John G., 235.
Maxwell, Eugene L., 139.
McLean, W. J., 333.
Miller, T. A., 379.
Morrison, George S., 184.
Norris, H. M., 474.
Owens, Galen B., 235.
Packard, Loren, 139.
Parkinson, Edward J., 139.
Pope, Franklin Leonard, 503.
Read, A. A., 236.
Scott, Frank, 283.
Sellers, Coleman, 532.
Sherman, L. B., 474.
Stirling, Patrick, 580.
Towne, Alban Nelson, 379.
Wallis, Philip, 184.
Wellington, Arthur Mellen, 283.
Williams, W. E., 333.

NOTES AND NEWS.

Abendroth & Root Manufacturing Co., The, 139, 428.
Accidents, Reports of Railroad, 404.
Aerial Navigation, Explosives, 388.
Aerial Tramway Over Niagara, 210.
Air, Transit in, 388.
"Alert" and the "Torch," The, 402.
American International Association of Railway Superintendents of Bridges and Buildings, 502.
American Railway Association, 236.
American Railway Association on M. C. B. Standards, Action of the, 141.
American Railway Master Mechanics' Association, 93, 141.
American Society of Mechanical Engineers, 44, 141, 333, 553.
An Old, Old Story, 109.
Arbitration, Practical, 211.
Armor Plate, Severe Test of, 254.
Armor and Ship, Test of, 515.
Armor Plate, Test of an 18-in. Carnegie,
Armor Plate, Test of 15-in., 186.
Armor Plates, Tests of Creusot, 474.
Armor, Tests of Turrets and Side, 404.
Association of Engineers of Virginia, 44.
Atlanta Exposition, The, 110.
Balloon, A New Dirigible, 196.
Balloon for 1900, Paris Captive, 97.
Balloons at Sea, The Use of Captive, 244.
Balloons, Life-Saving, 196.
Balloons, Observatory, 387.
Balloon Reconnoissance, 148.
Balloon, The Last of the Antwerp, 196.
Balloon Tour, A, 97.
Barge in the World, The Largest Tow, 186.
Battery Zincs, Improvement in, 139.
Battleships and Armor, Bids for, 550.
Battleships, Plans for the New, 403.
Battleships, The New, 489.
Bearings for Railway Cars, 347.
Bell Ringer, A Locomotive, 403.
Bicycles, 427.
Bicycles, Proposed Aerial, 195.
Blacksmiths' Association, The, 430.
Blake Pump, The, 185.
Blast from an 8-in. Gun, Force of the, 348.
Brick-Dust Mortar, 402.
Brown Hoisting and Conveying Machine Co., The, 139.
Boilers, Failure of the "Columbia's," 401.
Boilers, Interior Rust of, 7.
Boilers in the British Navy, Water-Tube, 350.
Boiler Tubes, The Best Material for, 93.
Bolster Guide Block for Freight Car Trucks, 402.
Boston Society of Civil Engineers, 236.
Cable, A Big, 488.
Cadet Engineers from Scientific Schools, 530.
Carnegie, Andrew, 401.
Car Sides, Coal, 141.
Car Wheel Works at Raleigh, N. C., New, 164.
Car Ventilation, 514.
Central Railway Club, 92.
Chimneys and Chimney Draft, 92.
Chinese Torpedo Cruiser, 550.
Chuck for Steam Chests, Planer, 428.
Cinder Blow-off, A, 8.
Civil Engineers' Society of St. Paul, 184, 553.
Clocks on Locomotives, 484.
Clouds, The Motion of, 292.
Clutch for 5-Ton Crane, Friction, 348.
Coal as a Fuel for Steam Boilers, The Properties of, 349.
Coal, Washington, 185.
Committees of Master Car Builders' Association for 1896, 474.
Continuous Rail in Street Railway Service, 501.
Creusot Armor Plates, Tests of, 474.
Dome Base, Pennsylvania Railroad, Pressed Steel, 254.
Draft Sheets, 488.
Dry-Dock at Port Royal, 185.
"Dupuy-de-Lome." The Armored Cruiser, 401.
Dynamite Guns, The British Admiralty and, 185.
Eight Hours per Day, The Result of Working, 347.
Electrical Energy, Conversion of Coal into, 8.
Electrical Notes, 547.
Electrical Vehicle in London, An, 164.
Electric and Steam Railroad Competition, 445.
Electric Cable Railway up the Stanserhorn, 516.
Electric Conduit Railway System, St. Louis Likely to Have an, 548.
Electricity, To Prevent Waste of, 401.
Electric Light Unreliable, 210.
Electric Locomotives, 548.
Electric Motors, Stationary, 548.
Electric Railroad, Elevated, 548.
Electric Railroads in Ohio, 7.
Engineers' Club of Philadelphia, 92, 140, 184.
Engineers' Club of St. Louis, 44, 92, 184, 236, 333, 501.
Engines, Gas, 347.
Eyesight, Dangers of Defective, 254.
Fast Railroad Time in England, 347.
Feed Water Delivered by an Injector, The Temperature of, 253.
Firearms, The Most Important Recent Improvement in, 402.
Fire-box Sheets, The Causes of Bulging of, 93.
Fireproof Compound, Electrical, 488.
Flying Machine, Hargrave's New, 244.
Flying Machine, Kress', 147.
Flying Machine, New, 388.
Fly Wheels, The Action of, 402.
Foster Engineering Co., The, 139.
French Exposition of 1900, 195.
French Ships, Stability of, 401.
Gas Engines, 347.
Gas Engines, Large, 109.
Gas for Barge Propulsion, Compressed, 110.
Gauge for Railroads was Fixed, How the 4 ft. 8½-in., 444.
Georgi Pobiedonostzeff, The, 239.
German Engineering Schools, 236.
Gordon Disappearing Gun Carriage, The, 7.
Gould Coupler Co., 427.
Guard Rails for Street Railways, Determination of the Groove in, 140.
Gun, A New, 61.
Guns, Efficiency of Modern, 525.
Guns for the British Battleship "Majestic," 515.
Hargrave's New Flying Machine, 244.
Heilman Locomotive, The, 401.
Hero, 184.
High Resistance Shunt Around Circuit Breaker, 253.
Hodgkins Prizes Awarded, 403.
Hydrostatics, The Solution of a Problem in, 184.
Incandescent Light Patent, 548.
Industrial Conciliation in the North of England, 11.
Institution of Junior Engineers, The, 184.
International Institute of Engineers and Architects, 430.
International Railway Congress, 109.
Ironclads, Small German, 9.
Inventions, Records of, 347.
"Katahdin's" Trial Trip, The Ram, 444.
"Katahdin," The Ram, 551.
Kress Flying Machine, 147.
Labor Legislation in New Zealand, 12.
Langley's Recent Experiments, Professor, 52.
Largest Sailing Ship Afloat, 428.
Lifeboat, A New Hydraulic Propelled Steam, 551.
Life-Saving Service, 549.
Liverpool Engineering Society, 553.
Locomotive, A New Use for the, 7.
Locomotive Bell-Ringer, A, 403.
Locomotive for the State Railways of Hanover, 401.
Locomotive Oil-Burning, 347.
Locomotive Repairing Work, 184.
Locomotives, Cocks on, 484.
Locomotives Constructed by R. Stevenson & Co., Early, Corrections, 108.
Locomotives in Argentine, Compound *versus* Simple, 484.
Locomotives in Germany, Compound, 484.
Locomotives on the Prussian Railroads, 348.
Locomotive, The Heilman, 401.
Los Angeles Electric Co., 427.
Lubricating Pulley Block, 427.
Lumber Still Left, Plenty of, 549.
Machine-Rolled Chains, 212.
Machinery of Warships, The, 10.
"Magnificent," The, 559.
Majestic, Her Majesty's Steamship, 232.
Master Car Builders' Association, 141, 501, 531.
Mechanical Problem, How to Approach a, 7.
Military Bicycle Association, A, 532.
"Monadnock," Monitor, 550.
Nashville and Wilmington, The, 489.

National Association of Manufacturers, The, 553.
National Free Labor Congress, 11.
Naval Architects, The British Institution of, 236.
Naval Lessons from the War, 233.
Navy, Additions to the, 185.
Navigating the Air with Kites, 550.
New England Railroad Club, The, 553.
New York Railroad Club, 502.
Nickle Steel for Boilers, 347.
"Northland," The, 185.
North Pole by Balloon, To the, 388.
North Pole Expedition, Andre's, 427.
North Pole, Swedish-Norwegian Union Flag at the, 484.
North Sea and Baltic Canal, 348.

Oil-Burning Locomotive, 347.

Painted *vs.* Planished Iron Boiler Jackets, 502.
Patent Office now up to Date, 108.
Penalties and Premiums, 550.
Pigeon Flying, French, 388.
Planing the Flanges of Driving Boxes Taper, Planer Attachment for, 404.
Power without Shafting, 401.
Practical Conciliation, 11.
Preservation of a Vessel with Crude Oil, 61.
"Prince George," The First-Class Battleship, 445.
Prizes Offered by the Institution of Civil Engineers, 475.
Profit-Sharing, Prize Essays on, 401.
Propellers, Triple, 550.

Rack-Rail Roads, 211.
Railway Construction in the Peruvian Andes, 282.
Railway Congress, The Forthcoming, 184.
Railroad Inventions, Prizes for, 93.
Record, The Latest, 488.
Report of Chief Constructor Hichborn of the U. S. Navy, 550.
Report of Engineer-in-Chief Melville to the Secretary of the Navy, 551.
Rivetted Joints, 93.
Rubber-Headed Nails, 7.
Rules of Car Interchange, 141.
Russian Imperial Yacht, New, 401.
Russian Naval Notes, 401.

Sand Filtration, 184.
Schmidt's Superheater, A Test of, 347.
Scrap Material, Utilization of Railway, 141.
Sea Monster of the Olden Time, A, 402.
Seats, Reserved, 253.
Shaft at Sea, Mending a, 7.
Ship Building Plans, New, 7.
Shot Holes, A Device for Stopping, 185.
Siberian Railroad, The, 401.
Signalling at Sea, Long Distance, 484.
Signalling by Sunlight, 7.
Slipping of Wheels, The, 445.
Smokeless Powder, 415.
Smoke Prevention, 349.
Snap Shot at a Gull, 97.
Snow from Balloons, Clearing, 484.
Soaring, 147.
South African Exhibition, 514.
Southern & Southwestern Railway Club, 140.
Stay-Bolt Broken in Two Places, 210.
Steam Propulsion and Aerial Navigation Foretold by Roger Bacon in 1618, 196.
Steersman, An Automatic, 60.
Strength of Bridge and Trestle Timbers, 502.
Suburban Tramway, French, 8.
Superheated Steam, 347.

Tank, A Naval Experimental, 473.
Telegraph Operators, Mortality of, 484.
Telephone Newspaper, A, 487.
Telephone, The Invention of the, 348.
Telephoning to and from a Lightship, 185.
"Texas," Injured in Docking, The Battleship, 552.
Throttle and Steam-Pipe Grinders, 487.
Tire, A Large, 253.
Torpedo Boat Destroyer "Boxer," A Trial of the British, 403.
Torpedo Boat Destroyer "Sokol," 530.
Torpedo Boat Record Speed, Another, 232.
Torpedo Boats, Fast, 401.
Torpedo Boats, The New, 186, 211.
Torpedo Boats, Three New, 474.
Torpedo, Carrying Capacity of a, 185.
Torpedo Effect, 9.
Torpedo Practice, Dangerous, 525.
Tools for Turning and Cutting Off Piston Packing Rings, 444.
Transit in Air, 291.
Train Lighting by Electricity on the Danish Railways, 10.
Trolley Cars in Brooklyn, Limit of Speed for, 254.
Trolley Roads, Underground, 548.
Tube-Beading Machine, Philadelphia and Reading Railroad, 211.
Tubes, The Best Material for Boiler, 93.
Turning-Off Lifting Shaft Journals, Device for, 401.

Ventilation, Car, 513.
Vzryv, The, 488.

Wages of Railroad Men, 109.
Warren's Improved Link, 110.
Warships, Trials and Performance of French, 349.
Warships, The Machinery of, 10.
Water Level in the Lakes, 110.
Water Pipe, Timber, 401.
Water-Tube and Scotch Marine Boilers, A Comparative Test of, 109.
Water-Tube Boilers in the British Navy, 350.
Willans Central Valve Single-Acting Engine, 428.
Wire Rope, The Endurance of, 401.